US005353451A

United States Patent [19]

Hsiung

[11] Patent Number: 5,353,451

[45] Date of Patent: Oct. 11, 1994

[54] **PLAYPEN FRAME STRUCTURE**

[76] Inventor: **Yu-Kuang Hsiung,** No.1-1 Hsi-Keng, Tsao Chiao Hsiang, Miao Li Hsien

[21] Appl. No.: **71,918**

[22] Filed: **Jun. 3, 1993**

[51] **Int. Cl.**[5] **A47D 9/00**

[52] **U.S. Cl.** **5/99.1;** 5/98.1; 16/325; 16/326; 403/325

[58] **Field of Search** 5/98.1, 98.3, 99.1; 16/325, 326; 403/65, 163, 322, 325

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,670,921	6/1987	Avni et al.	16/326 X
4,688,280	8/1987	Kohus et al.	5/99.1
5,211,498	5/1993	Huang	5/99.1 X
5,239,714	8/1993	Huang	5/99.1
5,243,718	9/1993	Shamil	5/98.3 X
5,293,656	3/1994	Chan	16/326 X

FOREIGN PATENT DOCUMENTS

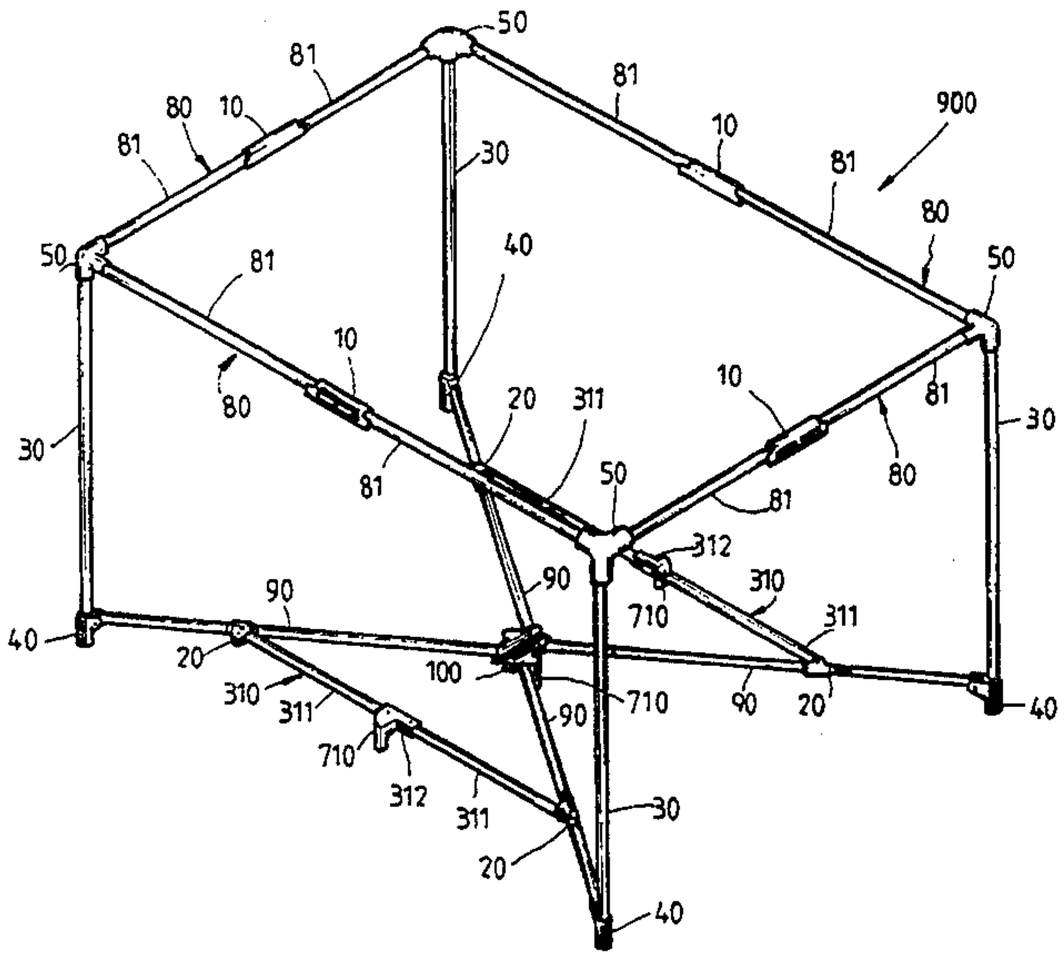
412070	2/1991	European Pat. Off.	5/99.1

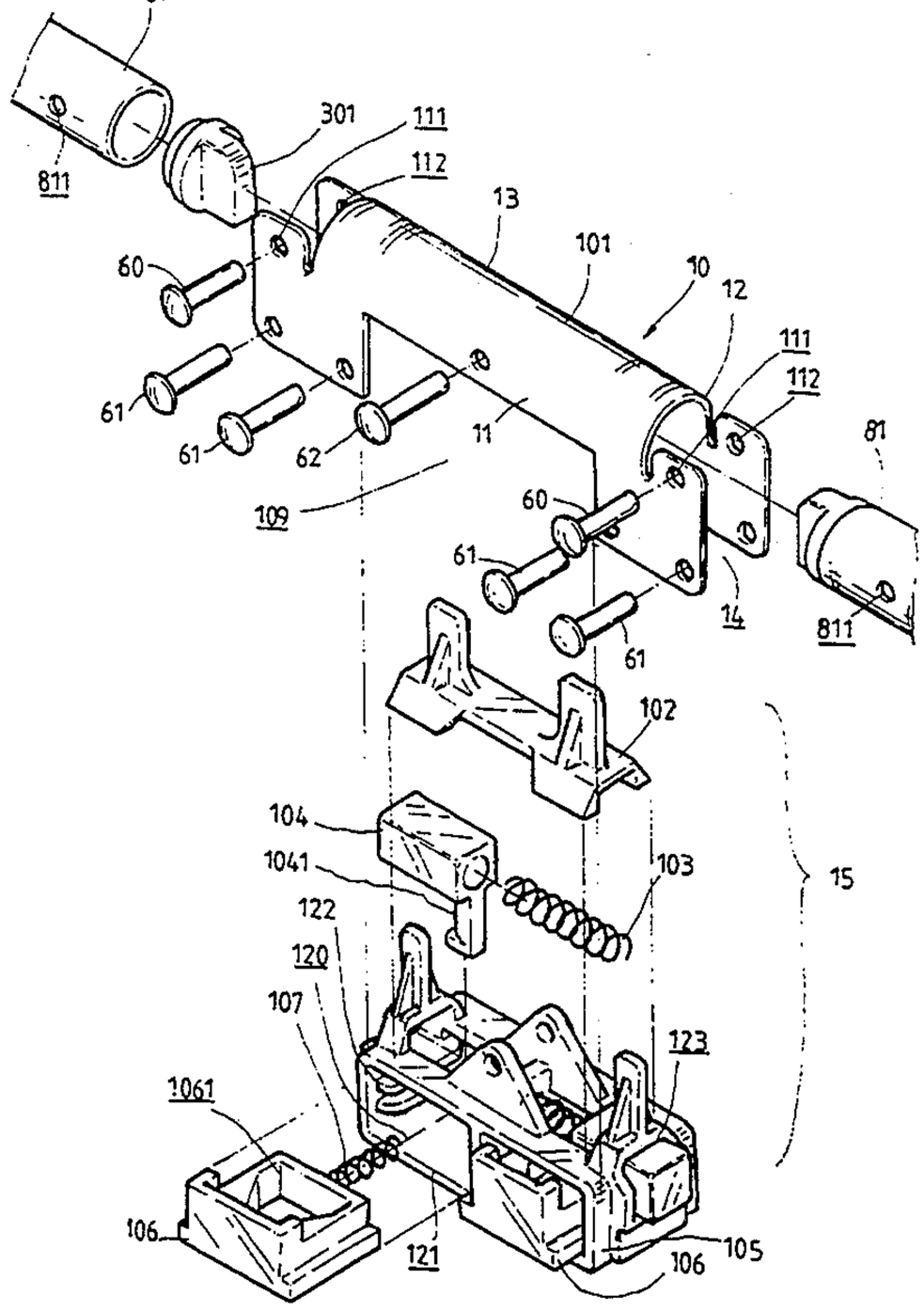
Primary Examiner—Michael F. Trettel
Attorney, Agent, or Firm—Pro-Techtor International

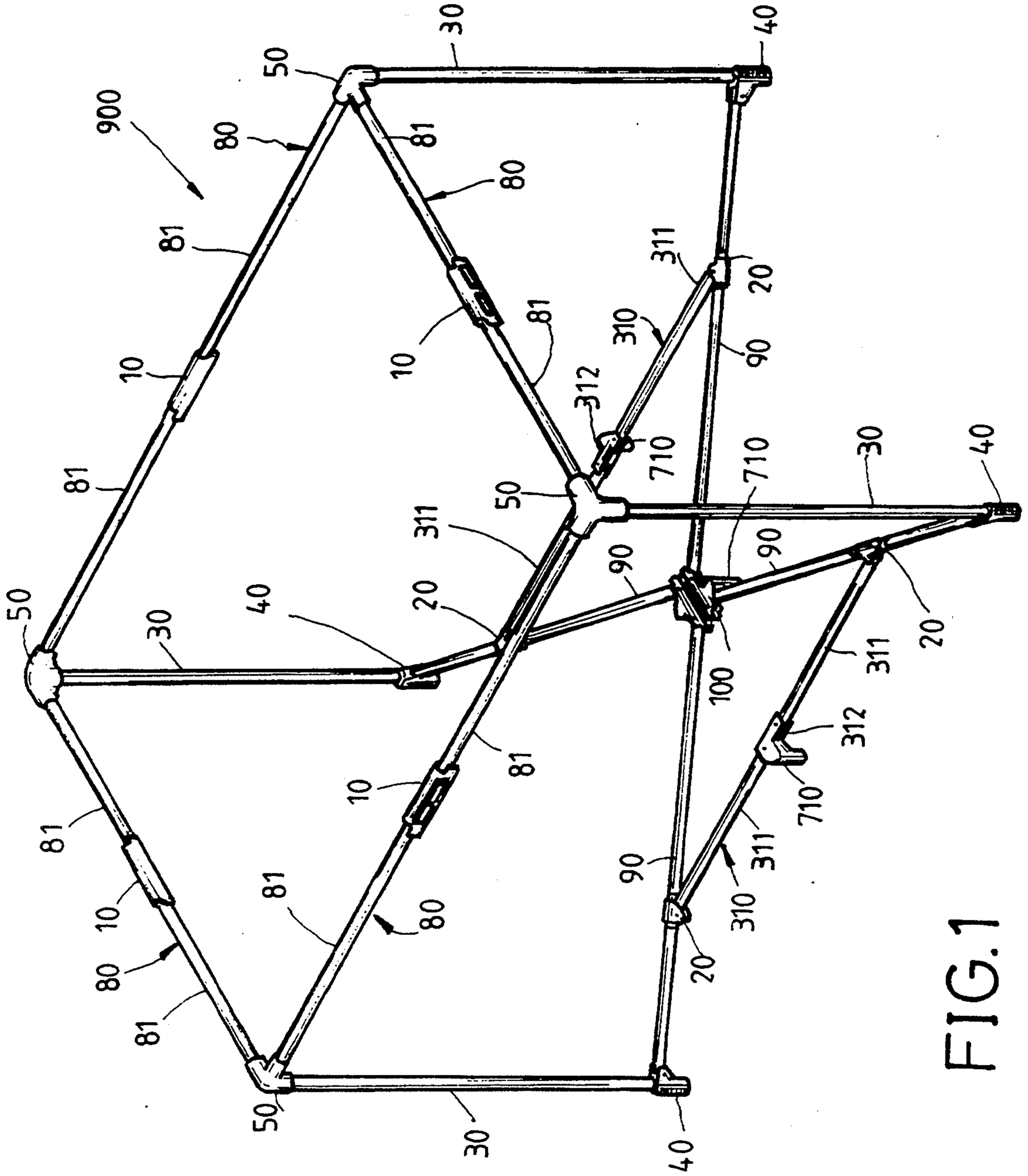
[57] **ABSTRACT**

A playpen frame structure comprises a rectangular top rail frame supported by four upright primary legs. The top rail frame comprises four rails, each constituted by two bar members pivotally connected to a mid-joint which allows the bar members to be rotatable about pivots mounted on the mid-joint. A retaining member is provided on each of the mid-joint to form a releasable retaining engagement with the two bar members to maintain the bar members in the expanded condition. The retaining member comprises release button for breaking the retaining engagement. There is also provided a reinforcement structure on the lower ends of the primary legs to hold the legs in position and thus avoid accident collapses of the legs. The reinforcement structure comprises four reinforcement bars respectively extending diagonally from the lower ends of the primary legs and pivotally connected to a central joint which is supported on the ground by secondary legs and two secondary reinforcement bars connecting between two adjacent diagonal reinforcement bars to firmly hold the diagonal reinforcement bars in position.

7 Claims, 7 Drawing Sheets






900
50
80
81
10
30
40
20
90
100
311
312
310
710
FIG.1

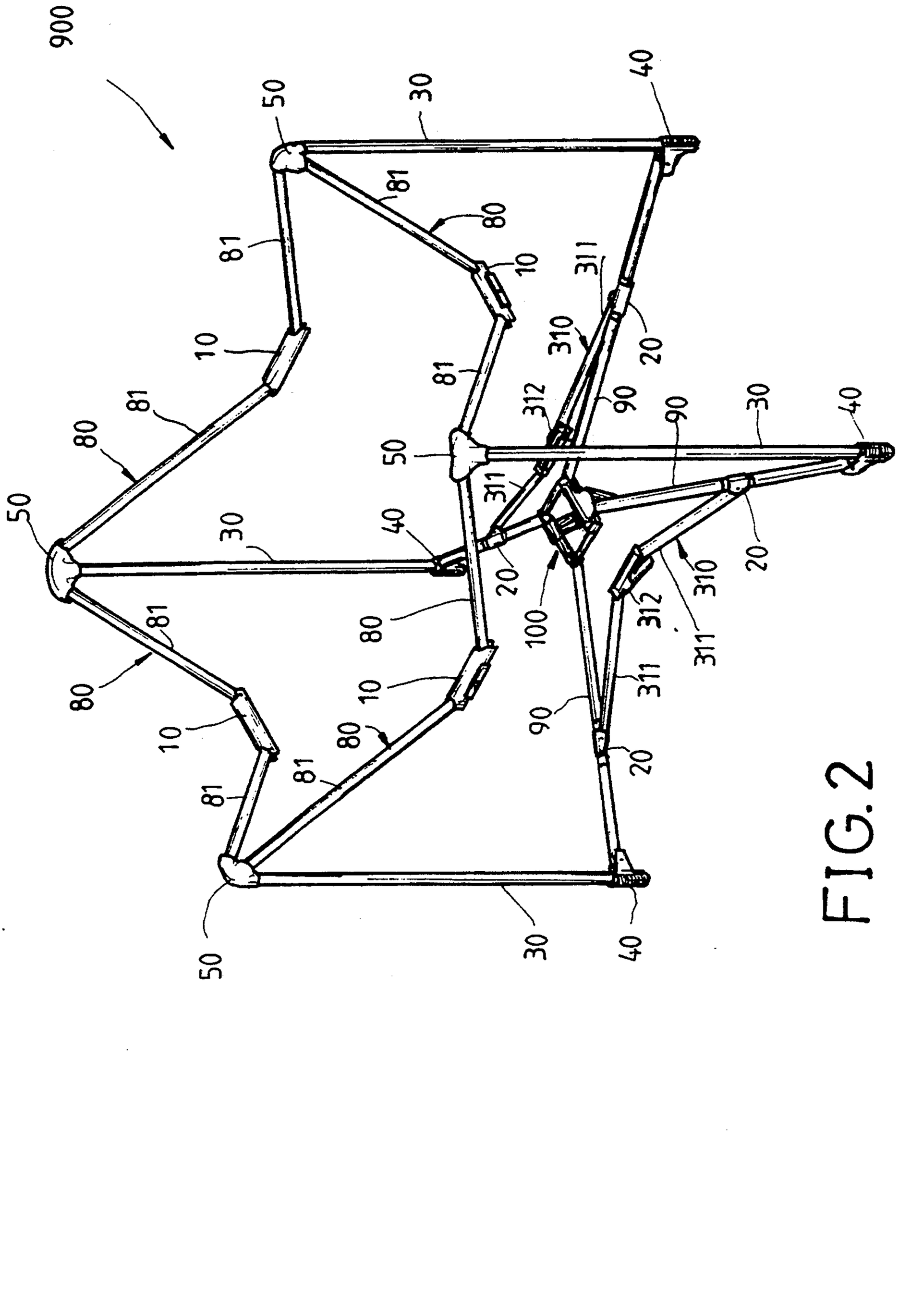


FIG. 2

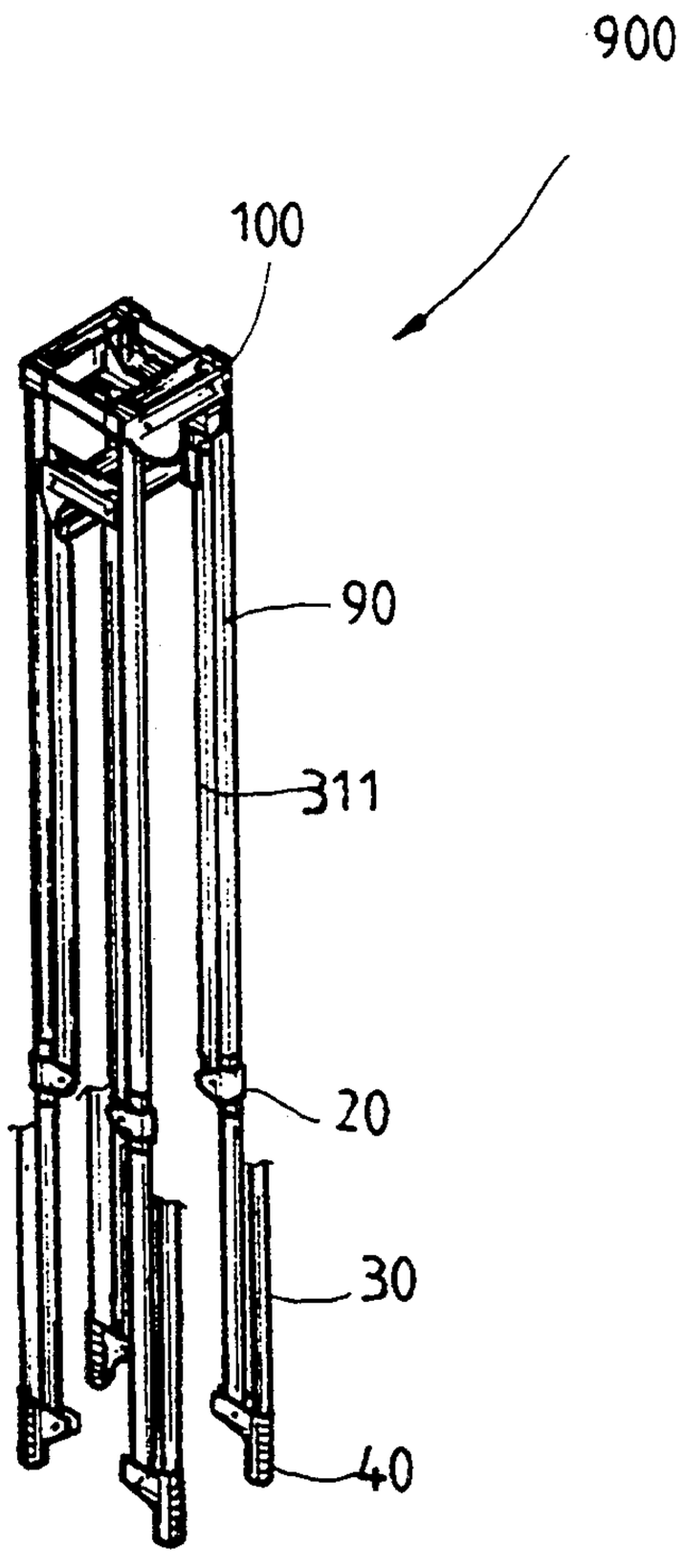


FIG. 3

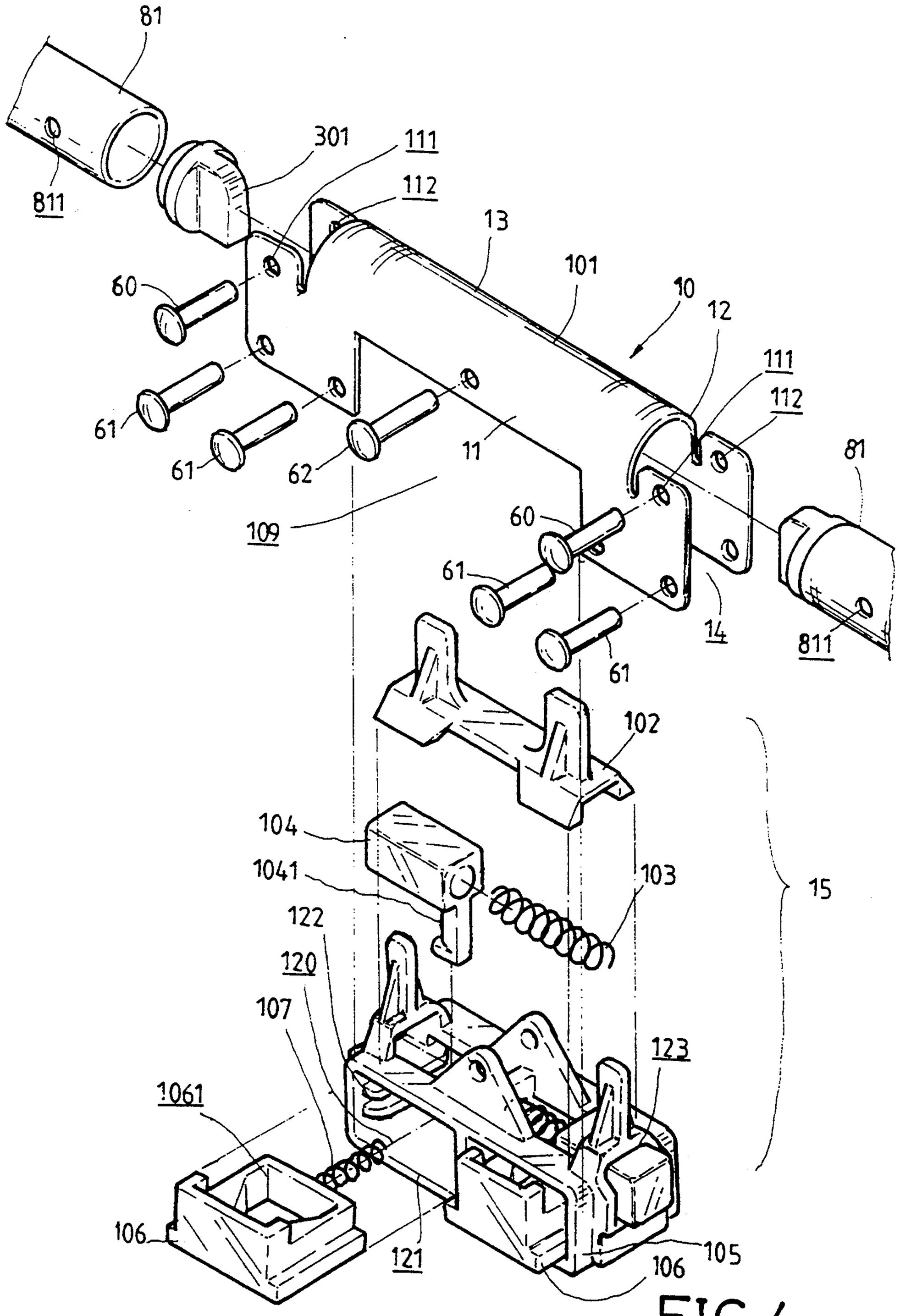

81
811
301
111
112
13
101
10
12
60
61
61
62
11
109
111
112
81
60
61
61
14
811
102
104
1041
103
15
122
120
107
123
1061
106
121
106
105

FIG.4

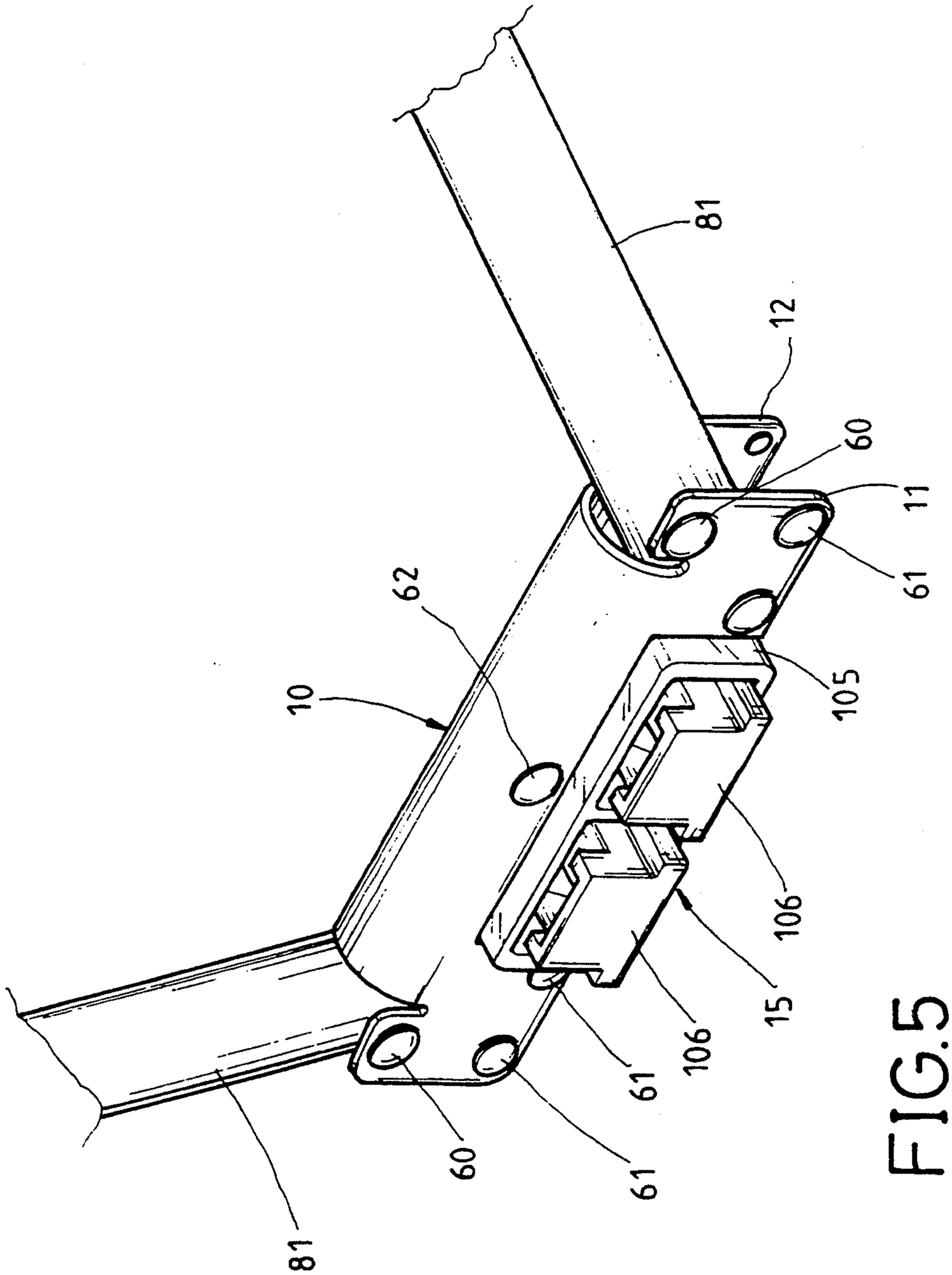


FIG.5

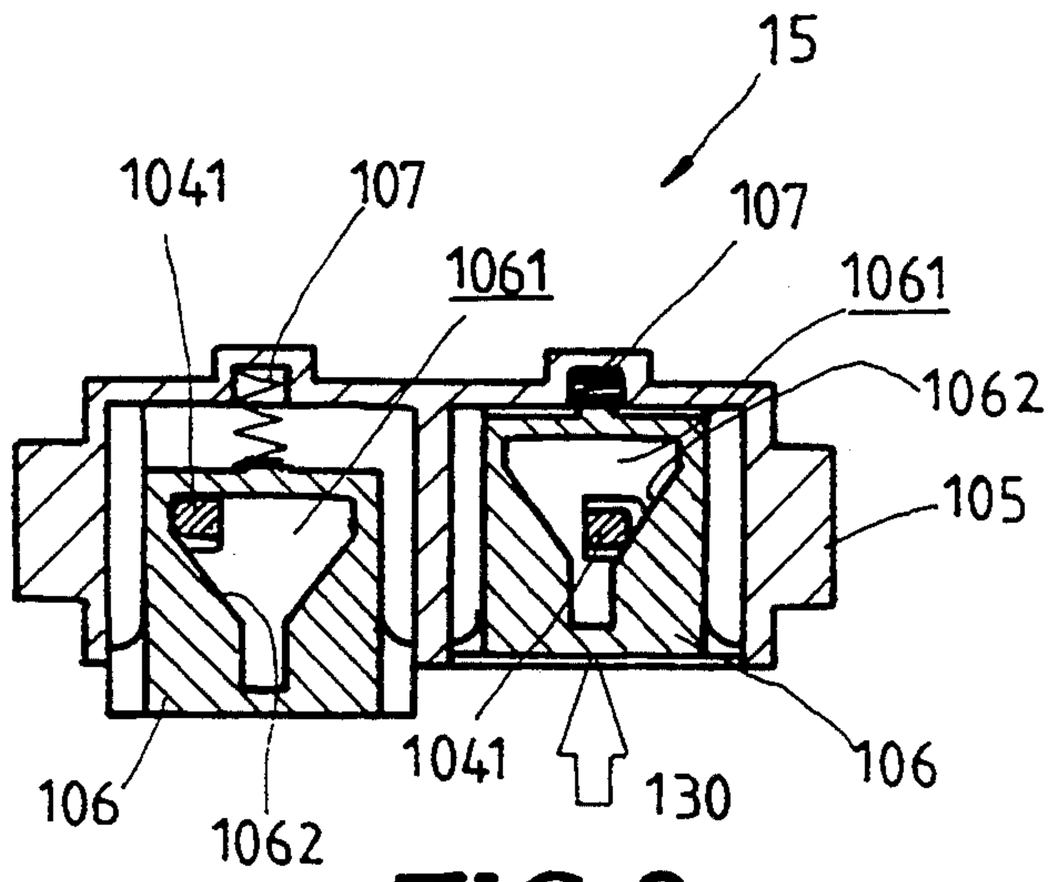


FIG.8

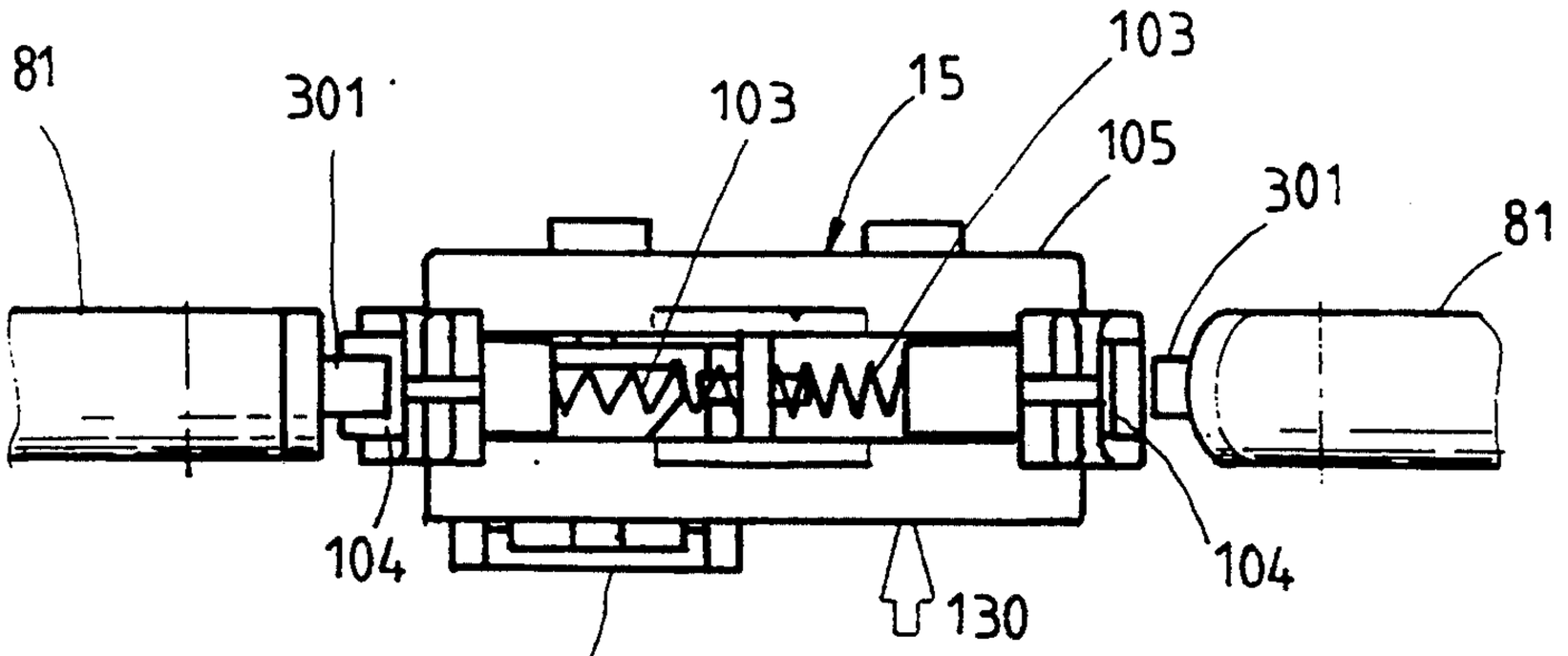


FIG.6

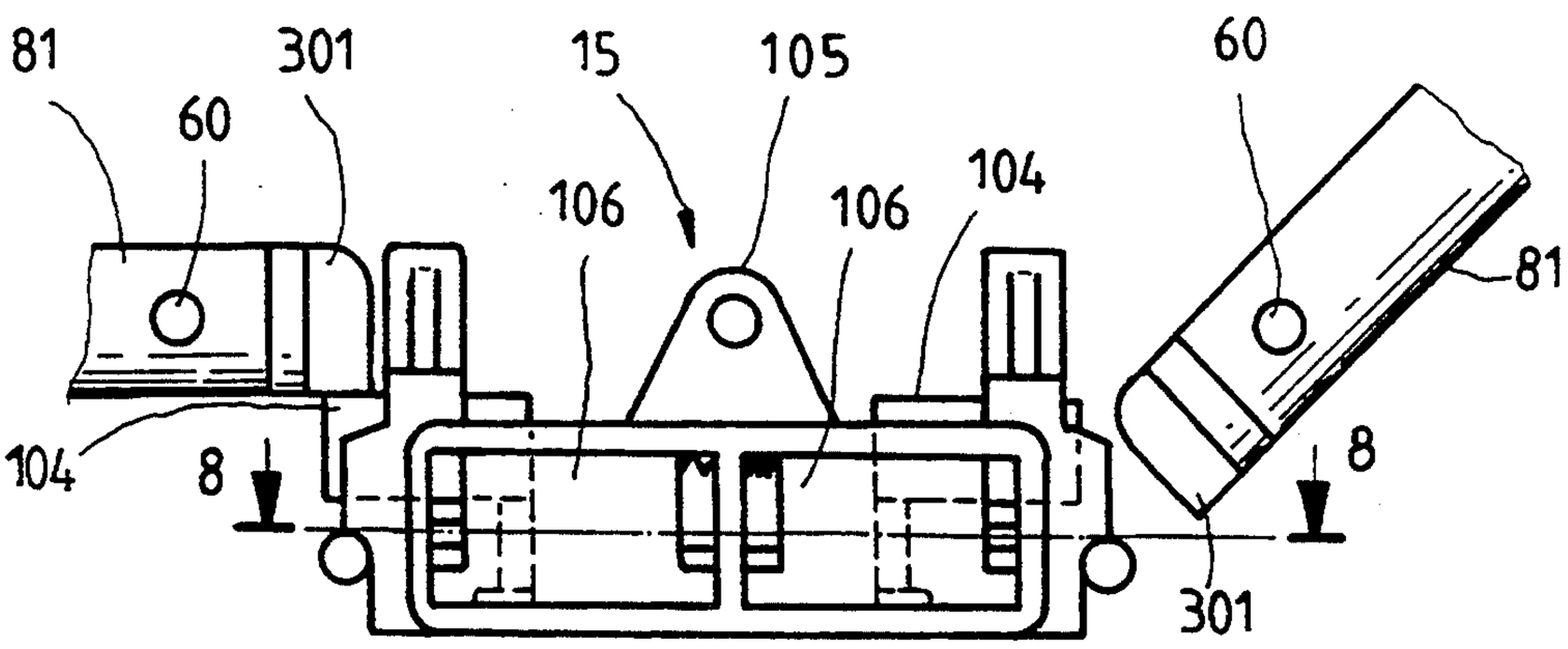


FIG.7

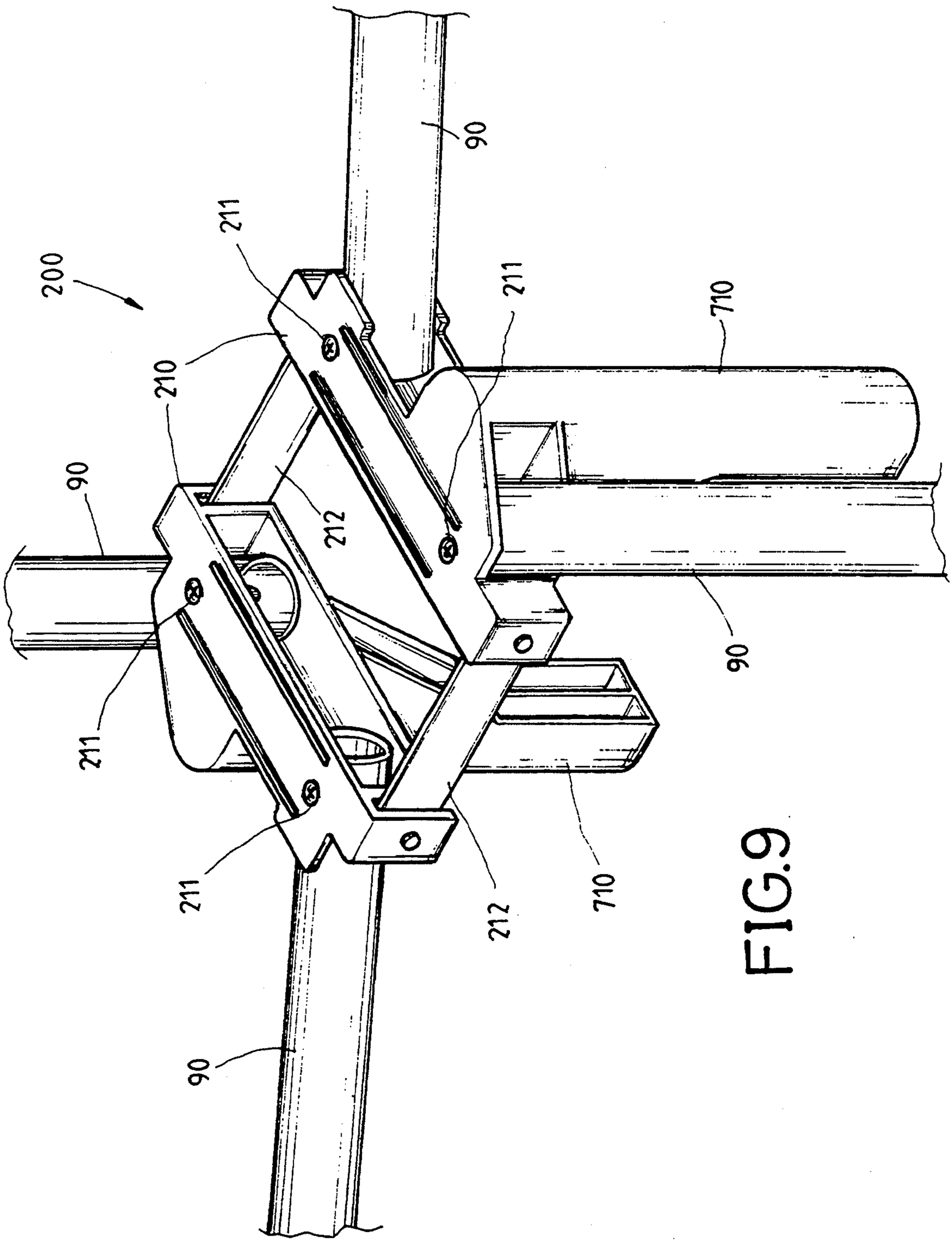


FIG.9

PLAYPEN FRAME STRUCTURE

FIELD OF THE INVENTION

The present invention relates generally to a playpen and in particular to a foldaway playpen frame structure.

BACKGROUND OF THE INVENTION

Playpens are space for safely taking care of young babies and there are lots of different designs of playpens available in the market. Some of the conventional playpens have a non-foldaway structure and thus occupying a great space when not in use. A foldaway playpen frame structure was developed to overcome the space problem. Such a foldaway playpen structure provides a saving in storage space when the playpen is not in use. Examples are Taiwan Patent Application Nos. 81208167 and 81208161. Both applications are filed under the name of the applicant of the present invention.

Conventional foldaway playpen frame structures comprise a collapsible top rail structure under which legs are pivotally secured at their upper ends. In the playpen of Taiwan Patent Application No. 81208167, there is provided a reinforcement structure pivotally mounted between the legs substantially at the lower ends thereof to more securely hold the legs in position. The problem of the reinforcement structure disclosed in the prior art Taiwanese patent is that once the reinforcement structure is accidently hit or struck, a sudden, undesired collapse of the playpen frame may occur. This may hurt the baby sitting therein.

In Taiwan Patent Application No. 81208161, a joint for connecting two bars in a collapsible manner to form a top rail is disclosed. The joint has a complicated and inefficient structure so that when folded, the playpen still occupies a large space. Further, the prior art joint is expensive due to the complication thereof.

A co-pending US Patent Application Ser. No. 08/032,133, filed on Mar. 16, 1993, still pending, under the name of the applicant of the present invention, discloses a foldaway playpen frame structure which although intended to overcome the previous problems, has a joint structure which is not very reliable.

It is therefore desirable to provide a foldaway playpen frame structure which overcomes the deficiencies of the conventional playpen structures.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a foldaway playpen frame structure of which each of the top rail is constituted by two bars pivotally connected to a common joint member wherein a releasable retaining member is provided to retain the two bars in the expanded position in a releasable manner to allow the playpen to be collapsed when not in use.

It is another object of the present invention to provide a foldaway playpen frame structure which comprises a reinforcement structure constituted by four diagonally-extending bar members which pivotally jointed on a central joint having legs extending to the ground to provide a more secure support to the baby sitting in the playpen and secondary reinforcement bars respectively connecting between two adjacent diagonal reinforcement bar members.

It is another object of the present invention to provide a foldaway playpen frame structure which comprises a joint structure which is much more reliable than the prior art joint structure and much easier in operation.

To achieve the above-mentioned objects, there is provided a playpen frame structure comprising a rectangular top rail frame supported by four upright primary legs. The top rail frame comprises four rails, each constituted by two bar members pivotally connected to a mid-joint which allows the bar members to be rotatable about pivots mounted on the mid-joint. A retaining member is provided on each of the mid-joint to form a releasable retaining engagement with the two bar members to maintain the bar members in the expanded condition. The retaining member comprises release button for breaking the retaining engagement. There is also provided a reinforcement structure on the lower ends of the primary legs to hold the legs in position and thus avoid accident collapses of the legs. The reinforcement structure comprises four reinforcement bars respectively extending diagonally from the lower ends of the primary legs and pivotally connected to a central joint which is supported on the ground by secondary legs and two secondary reinforcement bars connecting between two adjacent diagonal reinforcement bars to firmly hold the diagonal reinforcement bars in position.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects and advantages of the present invention will be readily apparent from the following description of a preferred embodiment taken in connection with the accompanying drawings, wherein:

FIG. **1** is a perspective view showing a foldaway playpen frame structure made in accordance with the present invention, which is illustrated in an expanded condition;

FIG. **2** is a perspective view showing the foldaway playpen frame structure of FIG. **1** in a partially collapsed condition;

FIG. **3** is a perspective view showing the foldaway playpen frame structure of FIGS. **1** and **2** in a completely collapsed condition;

FIG. **4** is a partial perspective view, in a larger scale, showing in detail the structure of a mid-joint used in the playpen frame structure of the present invention;

FIG. **5** is a partial perspective view showing the collapse of the mid-joint shown in FIG. **4**;

FIG. **6** is a top plan view showing a releasable retaining member used in the mid-joint of FIGS. **4** and **5** with the joint body removed for simplicity;

FIG. **7** is a side elevational view showing the releasable retaining member with the joint body removed for simplicity;

FIG. **8** is a cross-sectional view of the releasable retaining member shown in FIGS. **6** and **7**; and

FIG. **9** is a partial perspective view, in a larger scale, showing in detail the structure of a central joint of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the drawings and in particular to FIGS. **1**, **2** and **3**, wherein a foldaway playpen frame structure, generally designated with reference numeral **900**, is shown respectively in the expanded, partially collapsed and fully collapsed conditions thereof, the playpen **900** comprises four top rails **80** defining, for example a rectangle, on the four corners of which four

upright, elongated primary legs **30** are respectively mounted at the upper ends thereof. Pivotally secured on the lower end of each of the primary legs **30** is an elongated primary reinforcement bar **90** which is diagonally extending to pivotally connected at a remote end thereof to a central joint member **100** to form a diagonal reinforcement structure in order to maintain the primary legs **30** in a firm, non-movable relative to each other condition when the playpen is loaded. Two secondary reinforcement bars **310** are respectively connected between two adjacent diagonal reinforcement bars **90** in an opposite manner to provide an even stronger reinforcement structure.

Each of the top rails **80** is constituted by two elongated bar members **81** pivoted at a first end thereof to a mid-joint member **10** to be rotatable relative to each other so that when the bar members **81** are expanded to aligned with each other under the guide of the mid-joint member **10**, a straight top rail **80** is formed. Also, each bar member **81** of top rails **80** is pivotally connected at a second end thereof, opposite to the first end, to a corner joint **50** which constitutes one of the four corners of the rectangle defined by the top rails **80** and to which the upper end of the respective primary leg **30** is pivotally secured to form the pivotal connection between the top rails **80** and the primary legs **30**.

On the lower end of each primary leg **30**, a ground support member **40** is securely mounted to support the primary leg **30** on the ground and to provide the pivotal connection between the diagonal reinforcement bar **90** extending from the lower end of the primary leg **30** and the primary leg **30** itself.

In the embodiment illustrated, the structure of the corner joints **50** and the ground support members **40** may be known to those having ordinary skills and not the features of the present invention so that no detail thereof will be further given herein.

According to a first aspect of the instant invention, there is provided a playpen frame comprising an improvement in the structure of the mid-joint members **10** which will be described in detail hereinafter with further reference to FIGS. **4–8**.

With particular reference to FIGS. **4–8**, wherein an embodiment of the mid-joint members **10** constructed in accordance with the present invention is shown, each of the mid-joint members **10** comprises a joint body **101** which is constituted by two side plates **11** and **12**, preferably substantially parallel with each other, connected at a top side thereof with a semi-cylindrical portion **13**, to define therein a space **14** for receipt of the first ends of the two bar members **81** connected thereto. Each of the two bar members **81** is pivotally secured between the two side plates **11** and **12** of the joint body **101** at an end thereof by means of a pivot **60** which extends through holes **111** and **121** respectively formed on the side plates **11** and **12** in an opposite fashion and a hole **811** formed on the first end of the bar member **81** to form the pivot connection therebetween. The two bar members **81** are thus opposite to each other with respect to the joint body **101**.

Preferably, stop means is provided to limit the rotation of the bar members **81** to be only along a direction and thus preventing the bar members **81** from being rotated along an opposite direction. The stop means may comprise pins **61** extending between the side plates **11** and **12** at a location lower than the pivot pin **60** to allow the bar members **81** to be only rotatable toward the connection portion **13** of the mid-joint body **101**, as shown in FIG. **5**.

The mid-joint **10** further comprises releasable retaining means **15** mounted to the joint body **101** to retain the bar members **81** in the expanded position, as shown in FIG. **1**. In accordance with a preferred embodiment of the present invention, the retaining means **15** comprises a base **105** having two partitioned chambers **120** symmetrically formed therein for respectively receiving a paw **104** and a release button **106**.

Each of the chambers **120** has a front opening **121** and guiding rails **122** formed therein to allow the respective release button **106** to be movable, under the guide of the guiding rails **122**, with respect to the base **105** and in and out of the front opening **121**. The release button **106** is thus accessible from the front opening **121** to be depressible into the chamber **120** by the fingers of a user.

Each of the chambers **120** also comprises a side opening **123** to permit sideward movement of the respective paw **104** with respect to the chamber **104**. The sideward movement of the paw **104** allows the paw **104** to partially protrude out of the chamber **120** to engage and thus retaining the respective bar member **81** in the expanded position. This will be further described hereinafter.

Preferably, on each of the side plates **11** and **12**, a notch **109** is formed at a middle position between the two pivot pins **60** used to connect the bar members **81** to the joint body **101**. The base **105** which is preferably substantially complemental in shape to the notches **109** is disposed and secured in the notches **109** by, for example, a pin **62** extending through both the side plates **11**, **12** and the base **105**. This allows the base **105** to be slightly rotatable with respect to the joint body **101**.

Each of the paws **104** is biased by resilient means, such as a spring **103**, to have an end portion thereof protrude out of the base **10** from the side opening **123** thereof when not acted upon by any other external forces. The paw **104** has a leg **1041** extending into a recess **1061** formed on the respective release button **106** which is also biased by resilient means, such as a spring **107**, to have a portion thereof protrude out of the respective chamber **120** from the front opening **121**. The recess **1061** comprises an inclined side wall **1062** (see FIG. **8**) serving as a camming surface with the leg **1041** of the paw **104** as a follower member contactingly engaging the camming surface so that when the release button **106** is not depressed into the chamber **120** and thus is biased outward by the spring **107**, the follower member **1041** of the paw **104** is located at such a position to allow the paw **104** to be biased by spring **103** to partially protrude out of the respective side opening **123**, forming a retaining engagement with the bar member **81**. This is illustrated at the left hand side of the drawings of FIGS. **6–8**.

The right hand side of FIGS. **6–8** illustrates the condition when the release button **106** is depressed into the chamber **120** against the spring **107**, along the direction denoted by arrow **130** of FIGS. **6** and **8**.

When the release button **106** is depressed, the camming surface **1062** thereof acts upon the follower member **1041** of the paw **104** to move the paw **104** into the chamber **120** from the side opening **123** so as to break the retaining engagement between the paw **104** and the bar member **81**, as illustrated in the left hand side of FIGS. **6** and **7**. Once the retaining engagement is broken, the bar member **81** is allowed to rotate about the pivot pin **60**, permitting the top rail **80** to be collapsed.

The retaining engagement between the bar member **81** and the paw **104** may be formed by providing an end member **301** secured on the first end of the bar member **81** to be abuttingly supported by the paw **104** which is biased to extend out of the side opening **123**, as shown in the left hand side of FIGS. **6** and **7**. The paw **104** is now serving as a stop which prevents the bar member **81** to be rotated about the pivot **60** along the direction to collapse the top rail **80**. With the bar member **81** prevented from being rotated along either direction by the paw **104** and the pins **61**, the bar member **81** is retained in the expanded position.

A cover **102** may be provided on the base **105** to more securely maintain the paws **104** movable within the chambers **120**.

Turning back to FIGS. **1** and **2**, the four diagonal reinforcement bars **90** which are respectively connected between the ground support members **40** and the central joint member **100** provides a number of secondary legs **710** extending therefrom to the ground to support, together with the ground support members **40** secured on the lower ends of the primary legs **30**, the playpen **900** on the ground.

Further referring to FIG. **9** wherein an embodiment of the central joint member **100** constructed in accordance with the present invention is shown, the central joint member **100** comprises two opposite side members **210**, each having two of the four diagonal reinforcement bars **90** connected thereto by pivots **211** to allow the diagonal reinforcement bars **90** to be rotatable with respect to the side members **210** about pivoting axes substantially parallel with the legs **30**. Each of the side members **210** has at least a secondary leg **710** mounted thereto to extend therefrom to the ground for supporting the side members **210** on the ground.

The two side members **210** are connected together by two opposite and spaced apart link members **212**, each of which has two ends respectively pivoted to the two side members **210** to allow the side members **210** to be rotatable with respect to the link members **212** about pivoting axes substantially extending along a direction normal to the primary legs **30**. Thus, the reinforcement structure comprised of the diagonal reinforcement bars **90** and the central joint member **100** is collapsible to be that shown in FIGS. **2** and **3**.

With reference to FIGS. **1–3**, each of the two secondary reinforcement bars **310** comprises two bar members **311** jointed by a fourth joint **312** in a pivot manner so as to allow the bar members **311** of the secondary reinforcement member **310** to be rotatable with respect to each other and with respect to the fourth joint **312** for collapsing the reinforcement structure constituted by the diagonal reinforcement bars **90**, the central joint **100** and the secondary reinforcement bars **310**.

Preferably, each of the fourth joints **312** is provided with a secondary leg **710** extending therefrom to the ground for the support of the secondary reinforcement bars **310** on the ground.

The structure of the fourth joint **312** may be any known structure so that a detail description is not needed herein.

As shown in the drawings, the secondary reinforcement bars **310** are respectively connected between two adjacent diagonal reinforcement bars **90** to firmly hold the diagonal reinforcement bars **90** and to prevent the diagonal reinforcement bars **90** from moving from the desired position shown in FIG. **1** with respect to the other parts of the playpen **900**. The bar members **311** of the secondary reinforcement bars **310** are respectively connected to the diagonal reinforcement bar **90** in a pivot fashion via a connector **20** which is mounted to the diagonal reinforcement bar **90** at a suitable position.

It is apparent that although the invention has been described in connection with the preferred embodiment, it is contemplated that those skilled in the art may make changes to certain features of the preferred embodiment without altering the basic concept of the invention and without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A playpen frame structure comprising:

a rectangular top rail structure which is defined by four top rails pivotally connected by four corner joints to form a closed-loop structure; and

four upright, elongated, primary legs corresponding to the corner joints, each having an upper end pivotally connected to an associated one of the corner joints and a lower end with a ground support member mounted thereon to support on the ground;

primary reinforcement bars each of which has a first end pivoted to one of the ground support members and diagonally extends therefrom to have a second end thereof pivotally connected to a common central joint;

each of the top rails comprising two elongated bar members having first ends pivotally connected to a common mid-joint and second ends connected to the corner joints, said mid-joint comprising a joint body having two side plates which are substantially parallel and connected together at a top side thereof by a connecting portion to define a space for receiving the first ends of the two elongated bar members therein, pivots being provided to secure the first ends of the elongated bar members to the joint body to allow the elongated bar members to be rotatable relative to the joint body between an expanded position and a collapsed position, said side plates each having a notch formed thereon in an opposite manner;

each of said mid-joints comprising retaining means which has a base disposed in the notches formed on the side plates of the joint body, said base having two partitioned chambers formed therein, inside each of which chambers a paw is disposed in a sideward movable manner and biased by first resilient means to partially protrude out of a side opening of the chamber to engage and abuttingly support the first end of one of the elongated bar members in the expanded position;

each of said mid-joints further comprising release means to move said paw against the first resilient means into the chamber to break the abutting engagement between the paw and the elongated bar member;

said central joint comprising two side members each having two of said primary reinforcement bars pivotally connected thereto to allow said two primary reinforcement bars to be rotatable relative to the side member about axes substantially parallel with the length of said primary legs, the two side members being connected together by two spaced-apart but parallel link members, each of said link members having two ends respectively pivoted to the two side members to allow said side members to be rotatable relative to the link members about

axes substantially normal to the length of said primary legs.

2. A playpen frame structure as claimed in claim 1, wherein said release means comprises a release button disposed inside each of the two chambers of said base to be biased by second resilient means to partially protrude out of the respective chamber from a front opening of the chamber, the release button having a recess formed thereon for receiving therein an extension of one of the paws, the recess having an inclined side wall to serve as a camming surface contactable by the extension of the paw so that when the release button is forced into the chamber against the second resilient means, said camming surface moves the paw via the contact between the camming surface and the extension of the paw into the chamber against the first resilient means to break the engagement between the paw and the elongated bar member of the top rail structure.

3. A playpen frame structure as claimed in claim 2, wherein said second resilient means comprises a spring.

4. A playpen frame structure as claimed in claim 1, further comprising two secondary reinforcement bars respectively connected between two adjacent primary reinforcement bars in an opposite manner, each of the secondary reinforcement bars comprising two elongated members pivotally connected at first ends thereof to a common fourth joint, the two elongated members having second ends thereof pivotally connected to the primary reinforcement bars respectively via a connector.

5. A playpen frame structure as claimed in claim 3, wherein each of the fourth joints comprises at least a secondary leg extending therefrom to the ground.

6. A playpen frame structure as claimed in claim 1, wherein said first resilient means comprises a spring.

7. A playpen frame structure as claimed in claim 1, wherein each of the side members of said central joint comprises at least a secondary leg extending therefrom to the ground.

* * * * *